

GUIDELINES

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Viewpoints

Assessment of Growth Profiles in Cleft Children and Adolescents

Sir:

P oor weight gain, decreased growth, and an elevated prevalence of failure to thrive are often experienced by infants with cleft lip and/or palate and do not end with successful surgical repair.¹ Data on the growth of cleft patients into their later childhood and adolescence are relatively less available. The present study represents an investigation of the growth of cleft children ranging from infancy to early adulthood. Specifically, body mass index was used as an anthropomorphic measurement to compare patients with clefts to normative data to determine whether individuals born with isolated cleft deformities go on to have body mass indexes that differ from those of their unaffected peers.

Three hundred eighteen patients with cleft lip and/or cleft palate were identified and their medical

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records were retrospectively examined. Patients aged 2 to 21 years with isolated cleft lip and/or palate were eligible for the study, whereas those with syndromes or sequences or karyotype abnormalities, or those without at least two measurements from the 0- to 10-year-old and 10to 20-year-old age groups were excluded. Body mass index was calculated and used as the primary anthropomorphic measurement. To compare body mass indexes to normative values across the varying ages, a z score for each measurement was calculated using Epi Info based on the Centers for Disease Control and Prevention's clinical growth charts published in the year 2006. A body mass index z score greater than 0 indicates length to weight for age greater than that of the general population, and less than 0 indicates lower than that of the general population. Data were analyzed both by descriptive statistics (mean body mass index z score) and by means of t test both for the entire patient population and for stratifications on the basis of age, gender, and type of cleft.

A total of 59 patients were identified for inclusion in our analysis. The mean body mass index *z* score for all patients was 0.117. Patients were stratified by gender, with male patients having a mean *z* score of 0.087 and female patients a mean *z* score of 0.160, a statistically insignificant difference (p = 0.407). When stratifying by age, patients younger than 10 years possessed a mean *z* score of 0.208, and patients older than 10 years had a mean *z* score of -0.028 (p = 0.223).

The overall results of our study suggest that, on average, patients with isolated clefts do not have a deficit with regard to their body mass index during childhood and adolescence relative to the general population. Multiple studies have shown that cleft patients experience decreased growth and increased failure to thrive in the early years of life.² The reasons for this are multifactorial, with feeding difficulties early in life being a primary contributory factor.3 Our results suggest that these growth difficulties experienced by cleft patients early in life do not persist into later ages. Although statistical significance was not reached (and thus we cannot draw absolute conclusions between groups), our results do provide necessary preliminary conclusions for a potentially larger prospective study of body mass indexes among patients with clefts throughout childhood and adolescence. DOI: 10.1097/PRS.0b013e3181f63fa4

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301e

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DISCLOSURE

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REFERENCES

- Beaumont D. A study into weight gain in infants with cleft lip/palate. *Paediatr Nurs.* 2008;20:20–23.
- Cunningham ML, Jerome JT. Linear growth characteristics of children with cleft lip and palate. *J Pediatr.* 1997;131:707–711.
- Reid J, Reilly S, Kilpatrick N. Sucking performance of babies with cleft conditions. *Cleft Palate Craniofac J.* 2007;44:312–320.

Midface Buttress Framework Reconstruction after Close-Range High-Energy Injury

Sir: **W** e would like to propose a surgical technique for nearly total reconstruction of the midface after close-range ballistic injuries. This technique simplifies surgical execution and allows for nearly anatomical restoration and use of preexisting structures. A maximal length fibula osteocutaneous flap is dissected according to well-established techniques.¹⁻³ The fibula is left attached at the pedicle while prefabrication according to a template is performed (Fig. 1 and Table 1).

The middle third of the fibula is targeted for the maxillary arch construct. Average arc length of the maxillary arch that needed reconstruction from average adults is 6 to 7.5 cm. A closing wedge osteotomy every 2 to 2.5 cm would produce an arch of acceptable contour and thickness for future dental rehabilitation.

Proximal and distal thirds are used as bone grafts, to be contoured outside of their periosteal envelope

Table 1. Summary of Structural Deficiencies

Structure $(n = 6)$	No. Deficient (%)
Maxilla	6 (100)
Mandible	3 (50)
Upper lip	5 (83)
Columella/tip	5 (83)
Lower lip	3 (50)

according to the pattern shown in Figure 1. The average height of the frontomaxillary buttress is 4 to 4.5 cm. The length of orbital rim required for the reconstruction is 2.5 to 3 cm. Although this is initially overestimated, because of the lateral displacement of the zygomas, it is important to reduce the zygomas medially and fixate the zygomaticofrontal buttress (lateral orbital rim) and zygomaticotemporal buttress (zygomatic arch) with rigid osteosynthesis.

The proximal and distal periosteal paddles are preserved attached to the pedicle as vascularized periosteal patches. These are inset with the periosteal side facing anteriorly, and sown superiorly to the periorbita, medially to the residual lateral nasal mucosa (usually somewhat preserved), and laterally to the remaining zygomatic bodies. They serve as temporary sinus lining until mucosalization occurs. The periosteal surface is intended to be in contact with the bone grafts used to reconstruct the frontomaxillary buttress and inferior orbital rims.

Before transfer, the bed is prepared by reducing the zygomas from their usually severely lateralized position, and rigidly fixing them in place with zygomaticofrontal and zygomaticotemporal (arch) osteosynthesis. The superior and lateral edges of the midface at the radix and zygomatic bodies are burred down to a smooth contour to facilitate inset. The nasolacrimal duct is marsupialized to the remain-



Fig. 1. Template-based reconstruction of the midface using the fibula free osteoperiosteocutaneous free flap. The fibula is divided into segments according to pattern. The distal segment length is variable, and is often shorter than pictured. The proximal segment is split longitudinally to provide for vertical and horizontal buttresses: 4- to 4.5-cm frontomaxillary buttress–lateral nasal wall, and 2.5- to 3-cm inferior orbital rim buttress, according to individual midface morphotype.

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Volume 126, Number 6 • Viewpoints



Fig. 2. A secondary case after failed initial reconstruction with bone grafts. The soft tissues of the right cheek were reconstructed using a larger Tessier-type platysma myocutaneous flap. (*Above, left*) Anteroposterior postoperative view. (*Above, right*) Profile view after reconstruction. (*Below*) Bone volumetric reconstruction of postoperative midface reconstruction.

ing nasal lateral wall mucosa or the transferred lining flap.

The neomidface is transferred to its intended bed and final contouring is performed in situ. Osteosynthesis of the neomidface to the base of skull in the nasion area and to the zygomatic bodies is usually straightforward (Fig. 2). Microvascular anastomosis is performed afterward. The posterior vertical buttress is usually present and the reconstructed maxillary arch is abutted to it, with osteosynthesis if necessary. The pedicle of the fibula is short, and the microanastomosis can be either to a concomitant radial forearm as a bridge, or to a previously created arteriovenous loop.⁴ Recombinant human bone morphogenetic protein 2 on a bovine collagen carrier (INFUSE; Medtronic, Inc., Minneapolis, Minn.) is placed at osteosynthesis sites and, as a supplement to bone grafts, under the periosteal envelope. Additional onlay bone graft from unused harvested fibula or cranial bone graft shavings is placed to further contour the midface and orbital walls based on the buttress framework. DOI: 10.1097/PRS.0b013e3181f63f7b

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DISCLOSURE

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PATIENT CONSENT

The patient provided written consent for the use of his image.

REFERENCES

- Rodriguez ED, Martin M, Bluebond-Langner R, Khalifeh M, Singh N, Manson PN. Microsurgical reconstruction of posttraumatic high-energy maxillary defects: Establishing the effectiveness of early reconstruction. *Plast Reconstr Surg.* 2007; 120:103S–117S.
- Muzaffar AR, Adams WP Jr, Hartog JM, Rohrich RJ, Byrd HS. Maxillary reconstruction: Functional and aesthetic considerations. *Plast Reconstr Surg.* 1999;104:2172–2183.
- 3. Hidalgo DA. Fibula free flap: A new method of mandible reconstruction. *Plast Reconstr Surg.* 1989;84:71–79.
- Atiyeh BS, Khalil IM, Hussein MK, Al Amm CA, Musharafieh RS. Temporary arteriovenous fistula and microsurgical free tissue transfer for reconstruction of complex defects. *Plast Reconstr Surg.* 2001;108:485–458.

Intraoperative Sagittal Orbital-Globe Measurement Using a Disposable Anthropometer *Sir:*

A nthropometry is a useful tool for the diagnosis, treatment, and postoperative assessment of craniofacial disorders. Normative data can be used to quantify the extent of deformity, facilitate operative planning and execution, and assess operative outcomes. The most important anthropometric measurement in fronto-orbital advancement surgery is the sagittal orbital-globe relationship, or the sagittal distance between the superior orbital rim and the anterior cornea.¹⁻³ The normal value ranges from 8 to 11 mm and changes little with age,¹ although there can be ethnic variation. This provides a quantitative basis by which to determine the degree of anterior advancement necessary to normalize the sagittal position of the bandeau and forehead.

Despite the usefulness of preoperative anthropometry for planning fronto-orbital advancement procedures, most continue to rely on inaccurate "eyeball" estimates to determine the necessary frontal advancement. The use of anthropometry has been largely limited by the lack of accurate, convenient, and practical measurement techniques. Sophisticated tools have been described to measure the sagittal orbital-globe relationship,^{1,2} but require patient cooperation and cannot be used in infants. Three-dimensional photogrammetry is accurate for most anthropometric relationships, but corneal distortion and flattening limits its usefulness for assessing globe position. Standard exophthalmometers (e.g., Hertel and Luedde) measure the relationship of the lateral orbit to the anterior globe and are not useful for determining superior brow position. Even the Naugle exophthalmometer,⁴ which measures globe position relative to the superior and inferior orbital rims, does not provide an accurate measure of the sagittal orbital-globe relationship.

In an effort to establish a better preoperative measure of the sagittal orbital-globe relationship, we developed a simple anthropometric caliper made from the disposable ruler available in most operative packs. The device is made by cutting off the metric portion of the ruler, dividing this in two, and weaving each segment through two parallel 1-cm slits cut into the remaining portion of the ruler. The pairs of slits should be spaced approximately 2 cm apart. The patient's head is positioned so that the facial plane is roughly level with the floor. A cotton-tipped applicator is then used to gently retract the upper eyelid while each movable slide of the anthropometer is positioned over the pupil and the superior brow, respectively. The long axis of the instrument is aligned parallel to the floor (and the facial plane) (Fig. 1) and parallel to the facial midline from the frontal perspective (Fig. 2). The superior slide is advanced until it rests gently on the brow overlying the superior orbital rim. The inferior slide is



Fig. 1. The lateral perspective. The long axis of the anthropometer is held parallel to the facial plane. The eyelid is retracted using a cotton applicator. The superior slide is positioned on the area of the upper brow directly superior to the pupil. The inferior slide is then aligned with the anterior cornea and advanced gently. The difference between the slide measures is the sagittal orbital-globe relationship.



Fig. 2. The anterior perspective. To ensure an accurate measurement of the sagittal orbital-globe relationship, the instrument must be aligned with the pupil and the upper eyebrow parallel to the facial midline.

advanced very gently until it nearly touches the anterior cornea. Gentle contact will not harm the cornea—in nearly 5 years of consistent use, we have had no cases of corneal abrasion. The difference in advancement of the slides is the sagittal orbital-globe relationship.

Our simple anthropometric tool provides an easy method for determining the sagittal orbital-globe relationship before fronto-orbital advancement procedures. This information is invaluable for planning the degree of advancement required to normalize the patient's upper facial form. DOI: 10.1097/PRS.0b013e3181f63fca

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REFERENCES

- Mulliken JB, Godwin SL, Pracharktam N, Altobelli DE. The concept of the sagittal orbital-globe relationship in craniofacial surgery. *Plast Reconstr Surg.* 1996;97:700–706.
- Kohout MP, Pai L, Berenguer B, Tayler P, Pracharktam N, Mulliken JB. New instrument for orbital anthropometry. *J Craniomaxillofac Surg.* 1998;26:174–178.
- Pai L, Kohout MP, Mulliken JB. Prospective anthropometric analysis of sagittal orbital-globe relationship following frontoorbital advancement in childhood. *Plast Reconstr Surg.* 1999; 103:1341–1346.
- Naugle TC Jr, Couvillion JT. A superior and inferior orbital rim-based exophthalmometer (orbitometer). *Ophthalmic Surg.* 1992;23:836–837.

Successful Management of Methicillin-Resistant Staphylococcus aureus Orbital Cellulitis after Blepharoplasty Sir:

A lthough aesthetic blepharoplasty is a common surgical eyelid procedure, several complications have been reported, including rare instances of orbital cellulitis.^{1,2} Methicillin-resistant *Staphylococcus aureus* infections are of particular concern. To our knowledge, this is the first report of methicillin-resistant *S. aureus* orbital cellulitis following aesthetic blepharoplasty.

A 40-year-old man sought aesthetic improvement for his upper and lower lids. His medical history was significant for a remote methicillin-resistant *S. aureus* cellulitis infection of the scalp and Kaposi sarcoma of the right leg that had undergone excision 10 years previously. He underwent an uncomplicated bilateral upper eyelid skin and fat excision and lower lid transconjunctival blepharoplasty. One gram of intravenous cefazolin was given 30 minutes before surgery. On postoperative day 6, the patient had worsening eyelid erythema and pain. On examination, the patient was afebrile and other vital signs were normal. Best-corrected visual acuity was 20/80 in the right eye and 20/25 in the left eye. Pupils were round and reactive, but the right eye dem-



Fig. 1. (*Above*) Right orbital cellulitis on postoperative day 4. Note the significant right eyelid erythema, severe conjunctival chemosis, and superomedial globe displacement. (*Below*) Clinical photograph obtained 1 year after successful management of right orbital cellulitis. Note the normal and symmetric upper and lower lid positions.

onstrated a mild to moderate relative afferent pupillary defect. The right eye was proptotic and chemotic, and demonstrated severe restriction of gaze in all directions (Fig. 1, *above*). Scant purulent discharge was noted from the conjunctiva. Intraocular pressures were 24 in the right eye and 14 in the left eye. The optic nerves appeared healthy. See Figure 2 for computed tomographic findings. Because of his prior methicillin-resistant S. aureus infection, the patient was started empirically on vancomycin, 1 g administered intravenously twice daily, rifampin 600 mg administered orally daily, and TobraDex drops to the right eye. Results of blood cultures were negative; however, wound cultures were positive for oxacillin-resistant S. aureus sensitive to vancomycin and Bactrim. Over the next 4 days, the patient's best-corrected visual acuity improved to 20/ 20; extraocular movements, edema, erythema, and pain gradually improved, and the right afferent pupil-



Fig. 2. (*Above*) Coronal computed tomographic scan revealing an ill-defined pocket of fluid accumulation within the right inferior orbit. (*Below*) Axial computed tomographic scan revealing preseptal soft-tissue swelling and enlarged lacrimal gland with some fluid accumulation along the right lateral orbit. The ethmoids and maxillary sinuses were normal and there was no intracranial extension. lary defect resolved. The patient was then discharged on a course of Bactrim 80/160 mg by mouth twice daily for 10 days. A 12-month follow-up revealed a normal eye examination and symmetric appearing lids (Fig. 1, *below*). No surgical revisions were required and the patient was pleased with his cosmetic outcome.

Orbital cellulitis is a medical emergency that can lead to visual loss, cavernous sinus thrombosis, or even death.² Patients with orbital cellulitis should have a computed tomographic scan to evaluate the extent of disease and immediate treatment with intravenous antibiotics. Surgical intervention may be indicated if there is optic nerve compromise or evidence of an orbital abscess, or in cases refractory to treatment.

Methicillin-resistant *S. aureus* infections after aesthetic surgery are a growing concern.³ Although several interventions have been proven to reduce the incidence of surgical-site infections, no decolonization regimen has proven efficacious in long-term methicillin-resistant *S. aureus* eradication.⁴ The Centers for Disease Control and Prevention recommends against the routine use of vancomycin in antimicrobial prophylaxis and against routine universal active surveillance culturing for methicillin-resistant *S. aureus*.^{3,5} However, screening groups of high-risk patients may be worthwhile in the future.

Prompt diagnosis is critical in the management of methicillin-resistant *S. aureus* orbital cellulitis, and antimicrobial prophylaxis may be considered for immunocompromised hosts or patients colonized with methicillin-resistant *S. aureus*.

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DISCLOSURE

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REFERENCES

1. Lisman RD, Lelli GJ. Treatment of blepharoplasty complications. In: Aston SJ, Steinbrech DS, Walden JL, eds. *Aesthetic Plastic Surgery*. Shanghai, China: Elsevier; 2009:392–408.

306e

- Chiu ES, Capell BC, Press R, Aston SJ, Jelks EB, Jelks GW. Successful management of orbital cellulitis and temporary visual loss after blepharoplasty. *Plast Reconstr Surg.* 2006;118: 67e–72e.
- Elward AM, McAndrews JM, Young VL. Methicillin-sensitive and methicillin-resistant *Staphylococcus aureus*: Preventing surgical site infections following plastic surgery. *Aesthet Surg J.* 2009;29:232–244.
- 4. Davis KA, Stewart JJ, Crouch HK, Florez CE, Hospenthal DR. Methicillin-resistant *Staphylococcus aureus* (MRSA) nares colonization at hospital admission and its effect on subsequent MRSA infection. *Clin Infect Dis.* 2004;39:776–782.
- Siegel JD, Rhinehart E, Jackson M, Chiarello L; Healthcare Infection Control Practices Advisory Committee. Management of multidrug-resistant organisms in healthcare settings. *Am J Infect Control* 2007;35(Suppl 2):S165–S193.

Blepharoplasty Customized Marking: A New Technique for Better Results

Sir: The most important step of the blepharoplasty procedure is adequate preoperative marking in the real sitting position. The current technique for marking in blepharoplasty cases is the bunching or pinch technique.¹ Because of various amounts of skin changes and elasticity in different age groups and various races, this conventional technique may not achieve the most accurate marking in individual cases. In this article, we describe our preferred customized blepharoplasty marking technique of the upper eyelid, which gives us optimal results in various cases. The steps for skin marking of the upper eyelids are as follows:

- 1. Preoperative markings are made with the patient sitting upright and in neutral gaze and the surgeon in front of the patient.
- 2. The patient is instructed to look superiorly and inferiorly to assist in confirming the location of eyelid crease or the "dominant crease" when multiple creases are present. Then, the patient looks down approximately 10 degrees, and with elevation of excess skin and the brow by the other hand, the lid crease is marked with a fine-tipped marker. Therefore, we identify and mark the upper eyelid crease with a fine-tipped gentian violet marking pen after retracting the eyelid fold with a finger.
- 3. The patient looks up nearly 20 degrees and the overhanging excess skin defines the customized natural view from the medial to the lateral part of the eyelid (including temporal hooding) and then a mark is located just superior to this skin (Fig. 1).
- 4. For the last step, the marked area is connected more smoothly (Fig. 2).

After marking, conventional blepharoplasty is performed. Potential causes of patient and surgeon dissatisfaction following upper lid blepharoplasty include visible lateral or medial scars, skin excess (dog-ears), and webbing. Some authors advocate varying the amount of lateral skin removed, depending on age and apparent lateral skin excess, extend-



Fig. 1. Upper eyelid marking. Superior marking is performed when the patient looks up nearly 20 degrees.



Fig. 2. Marking of upper lid blepharoplasty after connection of marked points.

ing the lateral incision up to 15 mm from the lateral palpebral fissure on a horizontal line.² Halvorson et al.³ proposed a new design to decrease lateral and medial unsatisfactory results. In their procedure, markings were designed to end the medial incision 6 mm from the angular vein and the lateral incision 12 mm from the palpebral fissure, and to extend the incisions superiorly at 45 degrees. There are some other reports about the marking of upper eyelid blepharoplasty; for example, Har-Shai and Hirshowitz⁴ described a scalpel-shaped excision that is widest laterally and that tapers to a point medially. We think that their proposed designs are not consistent in all of the patients, and it may be necessary to change them in some cases.

In our dynamic, real-state customized marking, we can assess the amount of excess skin in the natural state of eyelid upright position and estimate how much skin can be removed without significant lagophthalmos. This marking design would appear to overcome the excess of skin in both superior to inferior and medial to lateral directions, and it is not necessary to change the marking individually for each patient. DOI: 10.1097/PRS.0b013e3181f63f90

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DISCLOSURE

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REFERENCES

- Zimbler MS, Prendiville S, Thomas JR. The "pinch and slide" blepharoplasty: Safe and predictable aesthetic results. *Arch Facial Plast Surg.* 2004;6:348–350.
- Rohrich RJ, Coberly DM, Fagien S, Stuzin JM. Current concepts in aesthetic upper blepharoplasty. *Plast Reconstr Surg.* 2004;113:32e–42e.
- Halvorson EG, Husni NR, Pandya SN, Seckel BR. Optimal parameters for marking upper blepharoplasty incisions: A 10-year experience. *Ann Plast Surg.* 2006;56:569–572; discussion 572.
- Har-Shai Y, Hirshowitz B. Extended upper blepharoplasty for lateral hooding of the upper eyelid using a scalpel-shaped excision: A 13-year experience. *Plast Reconstr Surg.* 2004;113: 1028–1035; discussion 1036.

Decision Making in Isolated Orbital Roof Fractures with a Case Report of the Upper Eyelid Approach to Treatment

Sir:

solated fractures of the orbital roof are not common. We present the case of a 31-year-old woman who sustained a pure orbital roof blow-in fracture along with our treatment of the patient by means of a transpalpebral approach that is not described in the literature. We present an algorithm for treatment based on experience and review of available literature.

A 31-year-old woman involved in a bicycle accident was thrown over the handlebars and sustained a blunt force injury to the right brow. After initial triage by the trauma service, our physical examination revealed normal acuity, spectacle hematoma that was most prominent in the right upper eyelid, slight proptosis, and upward gaze restriction. Pseudoptosis was present secondary to edema, and upper lid excursion was slightly decreased when compared with the normal side.

Thin-cut computed tomographic scanning with coronal and three-dimensional reconstructions indicated an isolated orbital roof fracture, and buckling with inward displacement and impingement on the levator/rectus muscles (Fig. 1). With this in mind, we attempted stable reduction of the fracture through a transpalpebral approach, thereby saving the patient the morbidity of a transcranial frontal craniotomy (Fig. 2).

Postoperative computed tomographic scan at 1 day revealed stable reduction of orbital roof segments, and



Fig. 1. Preoperative computed tomographic scan with coronal view showing inwardly buckled displaced orbital roof fracture.



Fig. 2. Postoperative computed tomographic scan with coronal view showing well-reduced and stable orbital roof after reduction by means of the transpalpebral approach.

308e

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Volume 126, Number 6 • Viewpoints

3-month follow-up revealed no evidence of levator or superior rectus impingement or exophthalmos. Skull base fractures involving the orbital roof have an unclear incidence but are reported to vary from 4 to 9 percent of all facial traumas at major centers.¹ The majority had severe concomitant injuries, including frontal sinus involvement or more extensive skull involvement. Pure orbital roof blow-in fractures are very rare. The intracranial approach has been used with analogous logic to the augmentation by mesh for ventral hernia repair. The question arises of whether such rigid support for the anterior skull base is necessary to prevent often-cited sequelae. Indications for treatment of orbital roof fractures in patients are anecdotal. It seems that traumatic encephaloceles are sufficiently rare (considering the vast experience reported at reporting institutions) that fixing all orbital roof fractures intracranially for the indication of preventing encephalocele may not be justified.2,3 Delayed treatment of these fractures has been shown to be very successful when expectant management seems prudent.⁴ It would be ideal to treat these by means of limited incisions when possible. Subcranial access by means of an upper eyelid incision has the benefit of not exposing the patient to an intracranial procedure, obviates the need for an intensive care unit stay and coronal incision, and places the patient at less risk of perioperative adverse events.

Very large fractures with concomitant frontal sinus fractures are good candidates for treatment by means of a traditional coronal incision and intracranial approach. Isolated orbital roof fractures are relatively low risk for development of proptosis, and only large fractures or fractures with fragments causing ocular displacement, levator dysfunction, or diplopia should be treated. When treatment of these fractures is undertaken, a limited upper eyelid approach should be considered.

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REFERENCES

- 1. Haug RH, Van Sickels JE, Jenkins WS. Demographics and treatment options for orbital roof fractures. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2002;93:238–246.
- Antonelli V, Cremonini AM, Campobassi A, Pascarella R, Zofrea G, Servadei F. Traumatic encephalocele related to orbital roof fractures: Report of six cases and literature review. *Surg Neurol.* 2002;57:117–125.
- Pandey PK, Chaudhuri Z, Aggarwal MK. Late presentation of orbital roof blow-out fracture. *J Pediatr Ophthalmol Strabismus* 2001;38:105–108.
- Hwang K, Kim SG, Lee SI, Ha Y. Blepharoptosis caused from compression of levator muscle by fractured orbital roof fragment. *J Craniofac Surg.* 2004;15:942–945.

Fixation of the Medial Canthal Tendon Using the Mitek Anchor System

Sir: **M** edial canthal tendon rupture results in canthal dystopia, increased intercanthal distance, and loss of palpebral angle.¹ Prevailing tendon reinsertion methods include transnasal wires and screws but have been reported to have a high failure rate, and are often complicated by medial canthal drift, wire extrusion, and contralateral orbital bone fracture under transnasal wire pressure.^{1,2}

We present a case of complex naso-orbitoethmoid fracture including avulsed medial canthal tendon treated with open reduction and internal fixation complicated by telecanthus and enophthalmos. Angular restoration of the palpebral fissure and improved eye aperture width and intercanthal distance was accomplished with soft-tissue fixation using the Mitek anchor system in medial canthopexy (a recent trend) during revision surgery.

A 17-year-old girl involved in a motor vehicle accident underwent open treatment and fixation of her multiple facial fractures through a coronal incision. Her naso-orbitoethmoid fracture was treated with a titanium mesh plate for her orbital fractures, transnasal wire fixation for a floating medial canthal bone segment, and rigid fixation of the surrounding bones.

The patient's postoperative course was complicated by telecanthus and decreased left eye aperture distance. Fifteen months postoperatively, we performed a periorbital osteotomy and removed the transnasal wires, resulting in a 3- to 4-mm medial migration of the soft tissue and medial canthal segment. This medial canthal segment was rigidly fixed into the nasomaxillary process using a 3-0 Ethibond Mitek screw.

Evaluation 4 weeks postoperatively after the placement of the Mitek anchor system demonstrated improvement of the position of the medial and lateral canthi, symmetry, and enophthalmos. Postoperative outcomes were assessed using digital photographs (Fig. 1). Measurements confirmed the aesthetic outcome of postoperative physician assessments (Table 1). After the revision operation using the Mitek anchor system and left orbital floor fixation, the patient experienced improvement in intercanthal distance



Fig. 1. (*Above*) Four weeks after the patient's initial operation, she had continued enophthalmos, telecanthus, and decreased left aperture difference. Transnasal wire fixation and rigid fixation were used for repair. (*Below*) Six weeks after our corrective surgery with the Mitek anchor system, telecanthus and left aperture width were improved, as were the shape and symmetry of the orbit.

Table 1. Ocular Measurements

Photograph Used	Before the Accident	After the Accident	Postoperative Measurement*	
			1	2
ICD	35.8	47.6	39.2	38.6
REAW	25.9	28	22.7	22.5
LEAW	24	22.3	18.5	23.2
RMCM	NA	17.5	17.3	16.35
LMCM	NA	30.1	21.9	22.3
RMVS	NA	NA	16.8	9.8
LMVS	NA	NA	6.5	12.65
RLVS	NA	NA	15.5	13.2
LLVS	NA	NA	13.6	25

ICD, intercanthal distance; REAW, right eyelid aperture width; LEAW, left eyelid aperture width; RMCM, right medial canthus-midline distance; LMCM, left medial canthal-midline distance; RMVS, right medial visible sclera; LLVS, left medial visible sclera; RLVS, right lateral visible sclera; LLVS, left lateral visible sclera; NA, not able to measure.

*Postoperative measurements 1 and 2 were taken 6 weeks from respective surgery date. ImageJ (National Institutes of Health, Bethesda, Md.) was used for specific anthropometric measurements.

(39.2 to 38.6 mm) and significant improvement in left eye aperture width (18.5 to 23.2 mm, or 25.4 percent increase). Measurements, however, may be affected by eyelid position, direction of gaze, and enophthalmos improvement.

Medial canthopexy addresses traumatic telecanthus and loss of palpebral angle through canthal tendon mobilization, subperiosteal exposure of the central segment of the medial orbit, and fixation to its bony attachment.¹ The most effective results are obtained by maintaining or resecuring the canthal tendon whenever possible to its original bony attachment and then displacing the bone to restore proper canthal position.³

Use of the novel Mitek anchor system has been shown to be a viable alternative for medial canthal tendon fixation.^{4,5} The normal medial canthal tendon is stronger than traditionally thought, withstanding forces of up 36 N before rupture. This strength is most closely approximated by the Mitek anchor system, at 97 percent of normal holding strength as compared with transnasal wires (74 percent) and 1.7-mm screw fixation into the medial orbit (92 percent).² The Mitek anchor system has been shown to offer considerably reduced perioperative time as a result of increased placement accuracy and greater procedural simplicity; installation of the Mitek anchor is also associated with a smaller external incision (3-mm), minimal dissection, and overall reduced invasiveness.5 DOI: 10.1097/PRS.0b013e3181f63f52

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REFERENCES

- Kelly CP, Cohen AJ, Yavuzer R, Moreira-Gonzalez A, Jackson IT. Medial canthopexy: A proven technique. *Ophthal Plast Reconstr Surg.* 2004;20:337–341.
- Dagum AB, Antonyshyn O, Hearn T. Medial canthopexy: An experimental and biomechanical study. *Ann Plast Surg.* 1995; 35:262–265.
- 3. Goldenberg DC, Bastos EO, Alonso N, Friedhofer H, Ferreira MC. The role of micro-anchor devices in medial canthopexy. *Ann Plast Surg.* 2008;61:47–51.
- 4. Antonyshyn OM, Weinberg MJ, Dagum AB. Use of a new anchoring device for tendon reinsertion in medial canthopexy. *Plast Reconstr Surg.* 1996;98:520–523.
- 5. Okazaki M, Akizuki T, Ohmori K. Medial canthoplasty with the Mitek Anchor System. *Ann Plast Surg.* 1997;38:124–128.

An Inexpensive and Easy Technique for Placing and Fixing Dorsal Grafts in Rhinoplasty

Sir: 🦰 artilage grafting has been a common surgical practice in aesthetic and functional rhinoplasty since 1980.1 This technique is performed to augment the nasal dorsum, to support the lateral nasal wall, and to manage nasal valve collapse.

In fixing the cartilage graft, the surgeon has to cope with the poor accessibility of the tunnel, which precludes the use of standard sutures in a situation where the graft must be placed accurately and firmly. Percutaneous sutures are widely used in anchoring cartilage grafts because they have been demonstrated to close dead space and thus prevent fluid accumulation or hematoma. Graft migration is avoided because of the anchoring of skin and soft tissues to the grafted nasal scaffold.² Classically, a suture with a straight needle is used.

Stephenson and Brotherston suggest using a straightsucker tube,3 whereas other authors use straight and curved needles.⁴ We describe here an easy and accurate technique for proper placement of grafts in rhinoplasties by open and closed approaches, both for minimal nasal dorsum correction and for total nasal reconstruction.

A polyglactin braided suture (3-0 or 4-0) and two spinal needles are required. Alternatively, two 23gauge needles could be used. The free tip of the thread is first introduced into the spinal needle using the needle hub as a funnel (Fig. 1). The spinal needle is then crushed with a needle holder to block the thread inside. The needle hub is then removed by detaching it from the needle and sliding it along the thread. At this point, the graft is threaded onto the suture, with two passages, and the needle of the thread is cut. Then, this tip of the thread is introduced into the other spinal needle, from which the hub was previously removed, and the needle is crushed as for the case of the preceding one.

The two spinal needles are introduced into the nasal fossa and guided to the point where the anchoring stitch is required, using a retractor to better expose the area (Fig. 2). The spinal needles pass from



case, the needle hub was previously removed. Alternatively, the needle hub can be used as a funnel in the first passage. (Below) The needle is then crushed with a needle holder.



Fig. 2. (Above) An Aufricht is used to facilitate the needle placement. (Below) The two needles and the graft threaded onto the suture are introduced.

inside to outside, leading the thread and thus fixing the graft. The two needles are cut from the thread and the two tips are tied externally, leaving the suture loose to let the skin expand in the event tissue edema occurs. Properly adapted paraffin gauze is placed under the suture knot to prevent skin damage. The suture is left in place for 6 to 7 days.

The procedure is very simple and highly accurate, and requires no expensive tools. Moreover, the surgeon can use his or her hands to direct the needle and choose with absolute precision the point at which to fix the graft. By comparison, other techniques^{2.4} require more passages of the needle through the skin, which increase the risk of damage to soft tissues because they are less precise and increase the time required for surgery. We have used this method with success widely over the years, achieving good results in graft fixation, even in complete nasal reconstructions with large cartilage grafts.

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REFERENCES

- Chait LA, Becker H, Cort A. The versatile costal osteochondrial graft in nasal reconstruction. *Br J Plast Surg.* 1980;33: 179–184.
- Karen M, Lian T, Stucker F. The use of percutaneous sutures for graft fixation in rhinoplasty. *Arch Facial Plast Surg.* 2003; 5:193–196.
- 3. Stephenson AJ, Brotherston TM. Technique of percutaneous anchoring suture placement. *Plast Reconstr Surg.* 2000;105: 1442–1443.

 Park C, Kim ES, Roh TS. Needle fixation technique in cartilage grafting. *Ann Plast Surg.* 1999;43:331–333.

Treatment of Basal Cell Carcinoma with Autogenous Growth Factors and Adipose-Derived Stem Cells *Sir*:

The hypothesis was proposed that autogenous platelet-rich plasma and adipose-derived stem cells can be used to treat and destroy basal cell carcinoma. It is also known that there is no carcinogenic potential of autogenous growth factors.¹⁻³

Furthermore, it has been demonstrated that in the presence of platelet-rich plasma, adult fat stem cells can differentiate into different cell lines and thereby accelerate wound healing.⁴

A 54-year-old male patient volunteered for the study. The lesion is shown in Figure 1. On November 26, 2009, 6 ml of blood was drawn from the patient for preparation of platelet-rich plasma and injected into two acid-citrate-dextrose tubes (Vacutainer; BD, Franklin Lakes, N.J.) for centrifugation at 3500 rpm for 8 minutes. Fat cells were aspirated from the lower abdomen under sterile conditions using a 10-ml syringe and an 18-gauge pink needle. The fat was not centrifuged. Two milliliters of platelet-rich plasma was mixed with 1 ml of fat cells. The tumor area was cleaned and anesthetized. The platelet-rich plasma/fat stem cell mixture was injected subcutaneously around the tumor. The lesion was excised with a 2-mm surgical margin after 21 days.

The size of the ulcerative lesion preoperatively as measured with a micrometer was 8.1 mm in diameter, and at the time of excision it was 13.5×11 mm. Macroscopic histologic analysis (performed by Dr. W. De Klerk, Dr. Davies Pathologists) of the final excision biopsy specimen showed an irregular gray lesion measuring 7×6 mm.

Microscopic analysis (Fig. 2) showed skin with marked solar elastosis and an ulcerated area of carci-



Fig. 1. Preinjection ulcerative tumor on the right forearm where the surrounding skin has extensive solar damage.

312e

Volume 126, Number 6 • Viewpoints



Fig. 2. A histologic slide of the excised tumor showing marked solar elastosis and an ulcerated basal cell carcinoma in situ (full-thickness epidermal dysplasia). The underlying dermis contains a marked lichenoid inflammatory infiltrate (which consists mainly of lymphocytes) and shows increased vascularity (all features consistent with the vicinity of the ulcer). There is no histologic evidence of the fat injections.

noma in situ. No lipid droplets were noted, and there was no evidence of a foreign body reaction. The surgical margin was clear and the closest peripheral margin was 2.5 mm.

The preliminary results are encouraging because the lesion size was smaller (according to the pathologist's macroscopic measurement) than the author's preoperative measurement. The skin shrinks a bit following excision and therefore the measurement is not of much significance. Because it was a chronic ulcerative lesion, some degree of tumor infiltration was expected. Thus, the in situ result was subjectively better than the expected outcome. The pathologic findings that the fat injections did not cause any local harm are encouraging. Two months (February 9, 2010) later, the patient had an excision of another similar ulcerative lesion that showed an early microinvasive squamous cell carcinoma arising from an area of proliferative actinic keratosis. This illustrates the importance of the further investigation of platelet-rich plasma and adipose-derived stem cells in the treatment of probably all cancers.

The rapid advancement in the understanding of platelet-rich plasma and adipose-derived stem cells could benefit cancer patient treatment. Early speculative results indicate that it may be possible to downgrade a tumor stage to an earlier/better stage. Further ethical controlled studies are necessary. DOI: 10.1097/PRS.0b013e3181f63fb6

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REFERENCES

- Marx RE. Platelet-rich plasma: Evidence to support its use. J Oral Maxillofac Surg. 2004;62:489–496.
- Piertzak WS, Eppley BL. Platelet rich plasma: Biology and new technology. J Craniofac Surg. 2005;16:1043–1054.
- Du Toit DF, Kleintjes WG, Otto MJ, Mazyala EJ, Page BJ. Soft and hard-tissue augmentation with platelet-rich plasma: Tissue culture dynamics, regeneration and molecular biology perspective. *Int J Shoulder Surg.* 2007;1:64–73.
- 4. Cervelli V, Gentile P, Scioli MG, et al. Application of plateletrich plasma to fat grafting during plastic surgical procedures: Clinical and in vitro evaluation. *Tissue Eng Part C Methods* 2009;15:625–634.

New Insight into the Pathophysiology of Tattoo Reactions following Laser Tattoo Removal Sir:

attoo dye can cause unwanted cutaneous reactions, local or generalized, after injection. Red dye has been reported to cause the most allergic reactions.¹

The treatment options for tattoo reactions include topical or intralesional corticosteroids, laser therapy, and full excision. The most common lasers used for tattoo removal or the treatment of allergic tattoo reactions are the Q-switched ruby (694 nm), Q-switched neodymium:yttrium-aluminum-garnet (532 nm and 1064 nm), and Q-switched alexandrite (755 nm).²

We present a case of a patient who developed a severe cutaneous reaction following attempted laser tattoo removal. This is the first report in which the patient developed a local cutaneous reaction at the treated tattoo and a similar reaction at a distant untreated tattoo. She also developed a generalized cutaneous reaction.

We present a 27-year-old, previously healthy, Caucasian woman with four professional tattoos. In 2007, she had two tattoos placed, on her foot and wrist, using the same tattoo artist and the same StarBrite red ink. She subsequently decided to have laser tattoo removal for the wrist tattoo only. Approximately 14 days after the second treatment, she developed an



Fig. 1. A right ventral wrist tattoo that was treated with laser.



Fig. 2. The patient's right dorsal foot. The patient developed a distant reaction at this untreated tattoo site.

erythematous, pruritic eruption on the red areas of the treated wrist tattoo (Fig. 1) and on the red areas of the untreated dorsal right foot tattoo (Fig. 2). The patient underwent two skin biopsies, which confirmed the tattoo reaction and systemic id reaction. Given the extent of the systemic reaction and prolonged course, further laser therapy was avoided and she was referred back to her plastic surgeon for excision of the involved tattoo areas.

Cases of both generalized and localized adverse reactions to laser tattoo removal have been reported^{3,4}; however, this is the first case to report additional involvement of an untreated tattoo. Historically, these reactions were thought to be related to the presence of cinnabar (mercuric sulfide) but, despite a restriction of mercury in tattoo ink in 1976,⁵ these reactions continue to occur, suggesting that they are the result of many different compounds.^{6,7} According to the Material Safety Data Sheet obtained from the ink supplier, our patient's tattoo ink contained: 3-hydroxy-4-[(2-methyl-5-nitrophenyl)azo]-N-(2-methylphenyl)-2-naphthalenecarboxamide, titanium dioxide, pigment red 210, and glycerol.⁵

The primary mechanism of destruction of tattoo pigmentation by laser treatment is thought to be by means of selective photothermolysis causing thermal expansion,^{3,5} which enables the pigment to become extracellular, where it can be phagocytosed and removed as a foreign body³ but can also lead to immune recognition and an allergic response.⁵ Tattoo artists have attempted to treat these reactions using "tattooing trough," which involves using distilled water to tattoo over the involved area, hoping that the pigment will come to the surface when they break the skin surface.⁸

This case demonstrates the potential to cause a tattoo reaction when attempting to perform laser removal of a tattoo. It also demonstrates that this type of reaction is most likely attributable to sensitization to the ink caused by immunologic exposure of the ink rather than creation of a neoantigen through the laser/ink interaction.

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REFERENCES

- 1. Mortimer NJ, Chave TA, Johnston GA. Red tattoo reactions. *Clin Exp Dermatol.* 2003;28:508–510.
- 2. Kilmer SL. Laser treatment of tattoos. *Dermatol Clin.* 1997;15: 409–417.
- Ashinoff R, Levine VJ, Soter NA. Allergic reactions to tattoo pigment after laser treatment. *Dermatol Surg*. 1995;21:291–294.
- England RW, Vogel P, Hagan L. Immediate cutaneous hypersensitivity after treatment of tattoo with Nd:YAG laser: A case report and review of the literature. *Ann Allergy Asthma Immunol.* 2002;89;215–217.
- Kazandjieva J, Tsankov N. Tattoos: Dermatological complications. *Clin Dermatol.* 2007;25:375–382.
- Sowden JM, Byrne JP, Smith AG, et al. Red tattoo reactions: X-ray microanalysis and patch-test studies. *BrJDermatol.* 1991; 124:576–580.
- 7. Engel E, Santarelli F, Vasold R, et al. Modern tattoos cause high concentrations of hazardous pigments in skin. *Contact Dermatitis* 2008;58:228–233.
- 8. INKED Inc. Available at: http://www.inkedinc.net/forum/ topic/showLastReply?id=808665%3ATopic%3A7372.

The Diagnosis and Treatment of Bilateral Suprascapular Nerve Compressions *Sir*:

e present a case report of bilateral suprascapular nerve entrapment in a 22-year-old woman. The purpose is to underscore a case in which a thorough physical examination and numerous diagnostic tests failed but in which a simple nerve block procedure proved to be diagnostic.

The patient's condition, arising at age 14, was examined closely by multiple physicians, with complaints of diffuse right shoulder pain radiating to the elbow with a bluish discoloration of the right hand. The suggested diagnoses were reflex sympathetic dystrophy, thoracic outlet syndrome, autoimmune disorders, bursitis/tendinitis, and brachial plexopathy. Diagnostic testing proved to be normal. She was prescribed medications and physical therapy, which briefly alleviated symptoms. She received three serial cortisone injections, which provided temporary relief (Figs. 1 and 2).



Fig. 1. Postoperative photograph.

On presentation to our office at age 18, physical examination revealed tenderness to deep scapular palpation, and restriction of right arm abduction to 70 degrees and external rotation to 45 degrees. We identified a trigger point, and used saline blocks as a placebo to rule out psychosomatic disorder. We administered lidocaine and bupivacaine, which provided relief, confirming the diagnosis of suprascapular nerve entrapment. A right suprascapular nerve decompression was subsequently performed.

The transverse ligament over the suprascapular notch was identified and carefully surgically dissected and transected off. With microsurgical techniques, epineurectomy was performed on the nerve and its branches. Immediately, the patient had resolution of her pain with increased range of motion for 4 months. The patient then presented with similar pain in the contralateral left shoulder for which the diagnosis of suprascapular nerve entrapment was confirmed by means of nerve block. A similar decompression was performed, which allowed the patient to partake in activities that involved full range of shoulder motions without restrictions.

Thirty months later, the patient presented with recurrent pain in the right shoulder. A similar nerve block was performed to confirm the diagnosis, followed by a second right suprascapular notch decompression where the scar tissue was removed. Eighteen months later, the patient is doing well, without pain/restrictions.

The suprascapular nerve is predominantly a motor nerve that originates from the upper trunk of the brachial plexus formed by the roots of C5 and C6. It passes through the suprascapular notch, under the transverse scapular ligament. Anomalies in size, shape of the notch, and the ligament have been associated with nerve injury at this level.¹⁻⁶ The predisposing factors include extreme shoulder motions and repetitive trauma. Most patients present with a burning, diffuse pain over the lateral/posterior shoulder, exacerbated by activity. The differential diagnoses include thoracic outlet syndrome, subacromial impingement syndrome, rotator cuff abnormality, C5-6 radiculopathy, rotator cuff tendinitis, and burner/stinger syndrome.



Fig. 2. Postoperative photograph.

In our patient, after a thorough history and physical examination, diagnosis was reached by means of a simple nerve block at the suprascapular notch. This diagnostic technique is underused and offers a quick and effective method of diagnosis. On all three occasions, we used this technique to confirm the diagnosis and subsequently provide successful, long-term surgical decompression for our patient. DOI: 10.1097/PRS.0b013e3181f63f12

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REFERENCES

- Rengachary SS, Neff JP, Singer PA, Brackett CE. Suprascapular entrapment neuropathy: A clinical, anatomical and comparative study: Part 1. Clinical study. *Neurosurgery* 1979;5:441– 446.
- Rengachary SS, Burr D, Lucas S, Hassanein KM, Mohn MP, Matzke H. Suprascapular entrapment neuropathy: A clinical, anatomical and comparative study: Part 2. Anatomical study. *Neurosurgery* 1979;5:447–451.
- 3. Bayramoğlu A, Demiryğrek D, Tüccar E, et al. Variations in anatomy at the suprascapular notch possibly causing supra-

scapular nerve entrapment: An anatomical study. *Knee Surg* Sports Traumatol Arthrosc. 2003;11:393–398.

- Malvina Alon, Weiss S, Fishel B, Dekel S. Bilateral suprascapular nerve entrapment syndrome due to an anomalous transverse scapular ligament. *Clin Orthop Relat Res.* 1988;234:31–33.
- Edelson JG. Bony bridges and other variations of the suprascapular notch. J Bone Joint Surg (Br.) 1995;77:505–506.
- Thomas A. La paralysis du muscle sous-epineux. Presse Med. 1936;64:1283–1284.

Giant Cervicothoracic Lipoma as a Manifestation of Human Immunodeficiency Virus–Associated Lipodystrophy

Sir:

uman immunodeficiency virus–infected patients can exhibit lipodystrophy as part of the disease process or during highly active antiretrovirus drug therapy. Lipodystrophy can present as lipohypertrophy or lipoatrophy.^{1,2} We report a rare case of giant cervicothoracic lipoma as a manifestation of human immunodeficiency virus disease.

A 43-year-man presented to our follow-up clinic with a rapidly enlarging mass on the left side of his neck and chest wall. He had earlier presented to us in 2005 with right upper brachial plexus injury with partial recovery of shoulder abduction and no elbow flexion. He underwent Oberlin transfer. Test results were positive for human immunodeficiency virus infection following a leading history and screening investigations. His postoperative course was uneventful and he was discharged with advice to take antiretroviral therapy. The patient wished to follow up with his family physician but did not take any antiretroviral drug therapy.

Three years later, he had developed diabetes mellitus and was started on oral hypoglycemic drugs, around the same time he noticed a bulge on the left side of the neck (opposite to the operated side). It grew rapidly to



Fig. 1. The extent of the lipoma (anteroposterior and lateral views).

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Fig. 2. (*Left*) Magnetic resonance imaging scan of the neck showing the widest dimension of the tumor and (*right*) excised lipoma.

its present size in 2 years (Fig. 1). He came to us because the neck swelling was causing discomfort, dragging pain, and difficulty in lying down. Clinically, the swelling was soft and mobile, with well-defined margins, and was consistent with the diagnosis of lipoma. The magnetic resonance imaging scan did not show any intrathoracic extension (Fig. 2).

Under general anesthesia, the whole lipoma was excised; it weighed 540 g and measured $17 \times 11 \times 7$ cm (Fig. 2). Histopathologic examination revealed benign adipocytes and no evidence of malignancy. The patient had an uneventful postoperative period.

Rapidly growing giant lipomas are rare.³ We feel in this patient it was secondary to human immunodeficiency virus. The exact cause of abnormal fat deposition is not clear, but the postulated theory is that human immunodeficiency virus type 1 causes dyslipidemia and lipodystrophy by means of impaired cholesterol efflux from macrophages and increased tumor necrosis factor- α , which modulates free fatty acid metabolism and lipid oxidation and attenuates insulin-mediated suppression of lipolysis.² Our patient also became a diabetic despite having no family history of diabetes.

The incidence of human immunodeficiency virusassociated lipodystrophy is variable. A prospective cohort study demonstrated a 17 percent prevalence rate after an 18-month follow-up.⁴ Variations in the reported prevalence rates are related to a variety of factors, including age, genetics, and human immunodeficiency virus medications (highly active antiretroviral drug therapy). A metaanalysis found a prevalence rate of 14 to 40 percent in human immunodeficiency viruspositive patients on highly active antiretroviral drug therapy. In untreated patients, the incidence of human immunodeficiency virus-associated lipoaccumulation was found to be 4 percent⁴; the common presentation was the presence of a dorsocervical fat pad ("buffalo hump").⁵ Suprapubic fat pads and pubic lipoma have also been reported as part of the symptom complex.¹ Although categorical fixation of an association between recently occurring giant lipoma with the existence of human immunodeficiency virus infection in an individual is difficult, we would recommend screening for human immunodeficiency virus in such patients if they have a leading history.

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PATIENT CONSENT

The patient provided written consent for the use of his image.

REFERENCES

- Palella FJ Jr, Chmiel JS, Riddler SA, et al. A novel pattern of lipoaccumulation in HIV-infected men. *JAMA*. 2006;296:766– 768.
- Oh J, Hegele RA. HIV-associated dyslipidaemia: Pathogenesis and treatment. *Lancet Infect Dis.* 2007;7:787–796.
- 3. Sanchez MR, Golomb FM, Moy JA, Potozkin JR. Giant lipoma: Case report and review of literature. *JAm Acad Dermatol.* 1993; 28:266–268.

- 4. Waters L, Nelson M. Long-term complications of antiretroviral therapy: Lipoatrophy. Int J Clin Pract. 2007;61:999–1014.
- Viciana P, Prados MD, Gomez Vera G, et al. "Buffalo hump" associated with protease inhibitors and use of corticoids ointment. *Int Conf AIDS*. 1998;12:94.

Bilateral Simultaneous Laterally Placed Superior Gluteal Artery Flap for Unilateral Breast Reconstruction

Sir:

The superior gluteal artery perforator (SGAP) flap has become an important alternative donor site for breast reconstruction, especially if abdominal tissue is inadequate or unavailable.¹ Although a few centers have reported the performance of bilateral simultaneous SGAP flaps for bilateral breast reconstruction,^{2,3} and bilateral simultaneous deep inferior epigastric artery perforator flaps have been used for unilateral breast reconstruction,⁴ to our knowledge, the use of bilateral simultaneous SGAP flaps has not been reported for reconstruction of a single breast.

The patient (body mass index, 18.6 kg m²) was first diagnosed with left-sided breast cancer in 2004. She underwent bilateral mastectomies with immediate implant reconstruction (the right mastectomy was prophylactic because of a strong family history of breast cancer). She then developed two local recurrences (in 2005 and 2007) and underwent left axillary lymph node dissection, and irradiation and further chemotherapy of the left side of the chest wall. Given her history of chest irradiation and obvious abdominal tissue inadequacy, we felt that the best option for her left breast reconstruction was bilateral simultaneous SGAP flaps.

To ensure blood flow and adequate length to the recipient vessels (internal mammary), we created an arteriovenous fistula to the internal mammary artery and internal mammary vein using a saphenous vein (arteriovenous) graft (Fig. 1, *above*). In the second stage, the bilateral lateral SGAP flaps were transferred for single-breast reconstruction 4 days after the creation of the arteriovenous fistula.

The procedure began in the supine position by first ensuring patency of the arteriovenous fistula. The lateral septal SGAP dissection was performed in the septum between the gluteus maximus and medius toward the medusa head, as described previously.⁵ On the back table, the pedicle of one flap was sutured to large side branches of the other flap, leaving only one superior gluteal artery and vein pedicle for the internal mammary artery and internal mammary vein anastomoses (by means of the saphenous vein graft arteriovenous fistula). The flaps were then transferred to the chest and their pedicles were anastomosed to the existing saphenous vein graft loop (Fig. 1, *center*).



Fig. 1. (Above) Saphenous vein graft anastomosed to the ipsilateral internal mammary vessels to create a temporary arteriovenous fistula. (*Center*) The "superior" SGAP flap pedicle is anastomosed to a side branch off the main pedicle of the "inferior" SGAP flap. In turn, the main pedicle of the "inferior" SGAP flap is then anastomosed to the two ends of the divided saphenous vein graft. (*Below*) Two new saphenous vein grafts are then anastomosed to the contralateral internal mammary vein and one of its intercostal perforators during the emergent flap take-back on postoperative day 1. The arterial anastomosis to the ipsilateral internal mammary artery is not shown because it remained patent and was not revised.

Because of signs of venous congestion, the patient returned to the operating room on postoperative day 1. The initial vein graft appeared thrombosed and

318e



Fig. 2. The patient at 6-month postoperative follow-up after bilateral SGAP flap surgery for unilateral breast reconstruction. Note the incision on the medial aspect of the right breast that was used to access the contralateral internal mammary vein during the take-back.

thus new vein grafts were used to the contralateral internal mammary vein and a contralateral, medial, intercostal perforator vein branch (Fig. 1, *below*). The patient was discharged on postoperative day 5 and had a nice result at 6-month follow-up (Fig. 2).

Given this patient's abdominal tissue inadequacy and her irradiated chest wall, the best potential donor site was her lateral gluteal tissue from both sides to accomplish projection and adequate skin coverage over her irradiated skin. To further support this approach, one must also consider that using bilateral SGAP flaps, as opposed to unilateral flaps, in a low-weight patient provides better donor-site symmetry.

This case report exemplifies a safe, viable expansion of the previously reported surgical technique using the SGAP flap for breast reconstruction. With the successful use of bilateral simultaneous SGAP flaps for the reconstruction of a single breast, the authors of this article report an approach that proved to be a useful alternative for breast reconstruction in this patient with insufficient abdominal, back, inner thigh, and gluteal tissue. DOI: 10.1097/PRS.0b013e3181f640a4

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REFERENCES

- Allen RJ, Tucker C Jr. Superior gluteal artery perforator free flap for breast reconstruction. *Plast Reconstr Surg.* 1995;95: 1207–1212.
- Werdin F, Peek A, Martin NC, Baumeister S. Superior gluteal artery perforator flap in bilateral breast reconstruction. *Ann Plast Surg.* 2010;64:17–21.
- Guerra AB, Soueid N, Metzinger SE, et al. Simultaneous bilateral breast reconstruction with superior gluteal artery perforator (SGAP) flaps. *Ann Plast Surg.* 2004;53:305–310.
- Beahm EK, Walton RL. The efficacy of bilateral lower abdominal free flaps for unilateral breast reconstruction. *Plast Reconstr Surg.* 2007;120:41–54.
- Rad AN, Flores JI, Prucz RB, et al. Clinical experience with the lateral septocutaneous superior gluteal artery perforator flap for autologous breast reconstruction. *Microsurgery* 2010;30: 339–347.

Mastectomy, Nipple-Areola Preservation, and Immediate Implant Reconstruction: Are Total and Partial Muscle Coverage Techniques Aesthetically Equivalent?

Sir: A n ongoing debate with prosthetic reconstruction concerns total versus partial muscle coverage.^{1,2} Total muscle coverage has been historically advocated to completely cover the implant and prevent contact with the mastectomy skin flaps. However, this paradigm has been recently challenged with the introduction of acellular dermal matrices. These matrices are now commonly used in the setting of partial muscle coverage and serve to compartmentalize the device and provide a barrier between the implant and the mastectomy skin flaps. The question has now focused on whether one is better than the other in terms of breast aesthetics and patient satisfaction. This report explores this issue is greater detail and provides some insight using a case report as an example.

A 42-year-old woman presented 5 years ago with a 1.0-cm, stage 1, invasive left breast cancer. She opted to have a mastectomy with preservation of the nippleareola complex and single-stage reconstruction using a 300-cc, smooth, round, silicone gel implant with total muscle coverage. The breast was soft and supple, nicely contoured, and without a palpable capsule. No irradiation was necessary. Three years later, she presented with a new-onset, 1.1-cm, invasive right breast cancer. She was once again interested in a mastectomy with nipple-areola complex preservation and single-stage reconstruction using a silicone gel implant. For this breast, however, partial muscle coverage and acellular dermal matrices would be used. The nipple-areola complex–sparing mastectomy was performed in the usual manner. A 16 × 6-cm sheet of AlloDerm (LifeCell Corp., Branchburg, N.J.) was prepared, inserted, and sutured as described previously^{3,4} (Fig. 1). Two-year follow-up of both breasts demonstrated mild asymmetry and natural contour, with no palpable capsule or evidence of capsular contracture (Fig. 2). The inframammary and lateral mammary folds were naturally defined on the right and less defined on the left.



Fig. 1. Intraoperative photograph of right breast reconstruction using partial muscle coverage and AlloDerm with a 300-cc implant.



Fig. 2. Postoperative photograph at 2-year follow-up. The right breast (partial muscle coverage plus AlloDerm) demonstrates a more natural inframammary fold, lateral mammary fold, and breast contour compared with the left breast (total muscle coverage).

Immediate implant reconstruction following mastectomy with nipple-areola complex preservation can result in excellent clinical outcomes. Natural breast aesthetics can be achieved whether the device is totally or partially covered with muscle and whether the reconstruction is performed in one or two stages. The case study presented represents a scenario that is ideal for comparison because the right and left breast reconstructions were identical in all aspects except for the fact that total muscle coverage was performed on the left breast and partial muscle coverage with acellular dermal matrices was performed on the right. Both reconstructions demonstrate excellent though different outcomes. Partial muscle coverage with acellular dermal matrices allowed for improved lower pole, inframammary fold, and lateral mammary fold contour as it redraped over the device. Total muscle coverage resulted in compression of the lower and lateral aspect of the breast/implant with blunting of the inframammary and lateral mammary folds.

In conclusion, partial muscle coverage with acellular dermal matrices appears to confer an advantage when compared with total muscle coverage. The long-term definition of the inframammary and lateral mammary folds is better defined and the breast is able to maintain a more natural contour. Patient satisfaction was higher with partial muscle coverage and acellular dermal matrices. This case report should serve as a template for future investigation. DOI: 10.1097/PRS.0b013e3181f64044

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REFERENCES

- Preminger BA, McCarthy CM, Hu QY, Mehrara BJ, Disa JJ. The influence of AlloDerm on expander dynamics and complications in the setting of immediate tissue expander/implant reconstruction: A matched-cohort study. *Plast Reconstr Surg.* 2008;60:510–513.
- Sbitany H, Sandeen SN, Amalfi AN, Davenport MS, Langstein HN. Acellular dermis–assisted prosthetic breast reconstruction versus complete submuscular coverage: A head-to-head comparison of outcomes. *Plast Reconstr Surg.* 2009;124:1735– 1740.
- Spear SL, Parikh PM, Reisin E, Menon NG. Acellular dermis assisted breast reconstruction. *Aesthetic Plast Surg.* 2008;32: 418–425.
- Nahabedian MY, Mesbahi AN. Breast reconstruction with tissue expanders and implants. In: Nahbedian MY, ed. Cosmetic and Reconstructive Breast Surgery. London: Elsevier; 2009:1–19.

Gluteal Shaping in the Massive Weight Loss Patient with Remaining Lipomatosis in the Upper Buttock and Lumbar Region *Sir:*

There has been a rapid increase in body-lift procedures worldwide in the past few years.^{1–3} The gluteal region itself is one of the most challenging parts of the massive weight loss body. Gluteal lifting is commonly performed through central or lower body lifting. There is no doubt about having most patients seeking augmentation versus gluteal reduction. Nevertheless, some patients suffer from remaining lipomatosis in the gluteal and lumbar regions after massive weight loss.

In the past, we noted the majority of fatty tissue in gluteal-lumbar lipomatosis to be located underneath the superficial fascial system.^{4,5} Only a minor portion was situated subcutaneously. In contrast, we have always used the superficial fascial system for preparation in body-lift procedures. Both aspects were determining for the surgical procedure described.

Preoperative markings are performed with the patient in the standing upright position. The incision line



Fig. 1. Approximation of the superficial fascial system after resection of the area of lipomatosis marked with methylene blue.

and extent of assumed resectable tissue are marked. Drawings are performed according to the principles for central or lower body-lift procedures. Because of these criteria, the amount of gluteal-lumbar lipomatosis is assessed in the manner of a liposuction-like marking. This part of the preoperative planning is essential for the procedure, as the overwhelming tissue in the gluteal-lumbar area is best visible in the upright position.

The operation starts with the patient in prone position (Fig. 1). We use methylene blue to mark the lipomatosis transcutaneously. The incision then starts at the superior line. Preparation is done at the level of the superficial fascial system. The margins of the lipomatosis become visible. The dots of methylene blue are connected. Retention stitches show the area of resection (i.e., the area of lipomatosis) inside the lining. Superficial fascia and subfascial fatty tissue are excised en bloc. One should leave enough fatty tissue on the deep fascia to prevent seroma formation. The edges of the superficial fascia are approximated with 2-0 Vicryl (Ethicon, Inc., Somerville, N.J.) single sutures. This maneuver leads to a plane superficial fascial system again. The most important side effect is the gluteal area being lifted with the approximation. The operation continues as is required for central or lower body-lifting procedures.

This method considers the goals of buttock aesthetics. These are best shown on lateral view: the presacral area has a lazy-S-shaped curve. Most of the gluteal volume is central, which is the most visible change after the operation. Preoperatively, these patients present with most of the gluteal volume in the lumbar and upper buttock area (Fig. 2).

This technique is effective and easy to perform. In a body-lift procedure, it is a fast and cost-effective method of improving buttock aesthetics in this particular pa-



Fig. 2. Preoperative (*left*) and postoperative (*right*) views.

tient population. There is no further need for liposuction. Because of preparation on the superficial fascia and excision of fatty tissue slightly underneath this level, lymphatic vessel harvest is assumed to be low. DOI: 10.1097/PRS.0b013e3181f64055

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REFERENCES

- 1. Aly AS, Cram AE, Chao M, Pang J, McKeon M. Belt lipectomy for circumferential truncal excess: The University of Iowa experience. *Plast Reconstr Surg.* 2003;111:398–413.
- Coon D, Michaels JV, Gusenoff JA, Purnell C, Friedman T, Rubin JP. Multiple procedures and staging in the massive weight loss population. *Plast Reconstr Surg.* 2010;125:691–698.
- Centeno RF. Autologous gluteal augmentation with circumferential body lift in the massive weight loss and aesthetic patient. *Clin Plast Surg.* 2006;33:479–496.
- Lockwood TE. Superficial fascial system (SFS) of the trunk and extremities: A new concept. *Plast Reconstr Surg.* 1991;87: 1009–1018.
- Beck H, Kitzinger H-B, Lumenta D, Frey M. Op2: The "gluteal SMAS" in the lower body lift. *Plast Reconstr Surg.* 2009;124:676.

Treatment of Metachronous Lower Extremity Defects with Delay and Splitting of a Previously Advanced Reverse Sural Artery Flap

Sir:

S oft-tissue reconstruction following distal third lower extremity trauma remains a challenging problem and is typically reconstructed using free tissue transfer. The reverse sural artery flap originally described by Masquelet et al. has gained popularity in reconstruction of these defects.¹ Multiple modifications have been made to improve flap viability and venous drainage, convey sensibility, increase flap size, and augment arc of rotation.²

Splitting has been described in flaps with consistent segmental neurovascular supply including the latissimus dorsi, pectoral girdle muscles, and the radial forearm flap. Tobin described flap splitting for chest wall and intrathoracic reconstruction.³ However, delay and splitting of a previously advanced fasciocutaneous flap based on random-pattern blood supply has not yet been described.

In this article, we present a case combining the concept of flap delay and splitting to maximize distal coverage of an adjacent area. A 44-year-old healthy man sustained a Gustilo grade IIIB open right tibia-fibula fracture with a 13 \times 6-cm distal tibial soft-tissue defect and a partial-thickness loss at the heel. He underwent open reduction and internal fixation of the tibia with hardware exposure in the soft-tissue defect. Given the calf size, defect location, and vascular status, a 16 \times

 Stage 1
 Stage 2
 Stage 3

Fig. 1. Depiction of the flap delay and splitting. *Stage 1*, Rotation of the reverse sural artery flap to cover the medial malleolar defect. *Stage 2*, Delayed splitting of the reverse sural artery flap through subcutaneous tissue down to the fascia. *Stage 3*, Complete division of the split flap and rotation into the heel defect with a skin graft to the donor flap site.

10-cm reverse sural artery rotation flap was elevated, including a small surrounding cuff of the gastrocnemius muscle.⁴

The flap was rotated and inset with minimal tension using an open tunnel approach. Over the course of the next 10 days, the flap demonstrated no evidence of ischemia or venous congestion. However, the heel ulcer progressed to full-thickness loss with exposed calcaneus after débridement. Additional coverage options were limited to free tissue transfer or advancement of a portion of the previously rotated reverse sural artery flap. The inferior portion of the flap that was not covering hardware or bone (defined fluoroscopically) was delayed with division through skin and subcutaneous tissue down to but not including fascia. One week later, the fascia was divided and the delayed segment was advanced and inset into the heel defect. The intervening area between split portions of the flap was skin grafted (Fig. 1). This maneuver provided durable, stable coverage of the exposed tibia and hardware and the subsequent heel defect (Fig. 2).

Techniques of flap splitting have been described in dual blood supply situations. Splitting the reverse sural artery flap has not been described previously. The flap was initially delayed by dividing the skin and subcutaneous tissues. In a second stage, the fascia was divided and the flap was elevated and advanced to cover the heel defect.

The concept of using flap engraftment and subsequent, staged transfer to a regional location was traditionally a main form of wound coverage before the development of axial and free flap transfer techniques. Tubed flaps were created and serially "waltzed" to dif-



Fig. 2. A reverse sural artery flap split and rotated to cover a heel defect. A split-thickness skin graft was placed over the donor flap site.

ferent locations around the body. Although cumbersome and inefficient, many lessons about tissue transfer were learned. Engrafted tissue can be partially elevated in a new location and once again transferred to a contiguous location, thereby allowing engraftment. These techniques, combined with modern axial flap transfer, solved this patient's problem wounds. DOI: 10.1097/PRS.0b013e3181f640ca

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REFERENCES

- Masquelet AC, Romana MC, Wolf G. Skin island flaps supplied by the vascular axis of the sensitive superficial nerves: Anatomic study and clinical experience in the leg. *Plast Reconstr Surg.* 1992;89:1115–1121.
- 2. Francesco G, Kolker D, Michael HR. Modified reverse sural artery flap with improved venous outflow in lower-leg reconstruction. *Ann Plast Surg.* 2007;59:563–565.
- Tobin GR. Segmentally split pectoral girdle muscle flaps for chest-wall and intrathoracic reconstruction. *Clin Plast Surg.* 1990;17:683–696.
- 4. Tan O. The sural artery patency test: A useful precaution in risky patients for the reverse sural flap. *Microsurgery* 2008;28: 147–152.

Simple Geometric Method for Designing a Transposition Flap: The Circles Technique *Sir*:

The geometry of the transposition flap is well described¹ and understood. In practice, however, it is not always simple to conceptualize and design, resulting in an undersized or oversized flap, requiring modification. We offer a simple technique that we call the circles technique transposition flap. The technique can be used in areas such as the scalp, trunk, or leg, where the donor site requires skin grafting. It can also be applied in areas of skin laxity, such as the face and neck, where primary closure is possible.

For the first circle, the longest distance (length or breadth) of the defect is used as the diameter of a circle



Fig. 1. Schematic representation of the circles transposition flap, showing the defect around which the first circle is constructed, the second circle in the direction of the blood supply, the third circle and the outline of the transposition flap, and finally the inset.

constructed around it. For the second circle, the direction of optimal blood supply is identified. This may be a known artery, but if unknown, a proximal location of blood supply may be used. A second circle of equal dimension to the first circle is placed in the direction of the blood supply, touching the first circle.

The third circle is drawn to shoulder both the above circles. For the outline, a line encompassing the two nondefect circles (i.e., the second and third circles) is drawn. An incision is made about this line; the flap is elevated and transposed onto the defect (Fig. 1).

The donor site is either skin grafted or, if there is sufficient skin laxity, closed primarily by adding a triangular extension to the third circle. This flap is based on geometric principles, allowing optimal use of the available local tissue, without underestimating or overestimating the size of the flap. There is no need for equipment or tedious measurements.

When the origin of the blood supply is unknown, the flap base (i.e., the second circle) can be placed in a position proximal to the defect, thus relying on the subdermal plexus, as such a random-pattern flap can be safely raised using dimensions of 2 to $1.5:1.^2$ The safety of the flap can be enhanced by including the fascia, ensuring axiality, or including a perforator.

We have used this technique in a variety of settings with favorable results. The most common application is following trauma of the lower limb and scalp. However, the technique has been used successfully to close a hard palate fistula following irradiation, where the flap was based on the greater palatine artery and the donor defect was allowed to granulate. We have used it to close defects following resection of malignant skin lesions with and without primary closure of the donor site.

The circles technique is a simple way of conceptualizing and designing a transposition flap that is based on geometric principles. It can be used by residents and experienced plastic surgeons with favorable results.

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REFERENCES

- 1. McGregor AD, McGregor IA. Fundamental Techniques of Plastic Surgery and Their Surgical Applications. 10th ed. New York: Churchill Livingstone; 2000.
- 2. Mathes SJ, ed. *Plastic Surgery*. 2nd ed. Philadelphia: Saunders Elsevier; 2006.

A Virtual Surgical Amphitheater: Using Technology to Allow Medical Students and Residents to Observe Operations Anytime, Anywhere

Sir:

n today's world, there is a very high premium on technology and its seemingly limitless potential to improve every aspect of our lives. At the center of the

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Fig. 1. Screenshots demonstrating how the labeling of anatomical landmarks before and after surgery can be of educational significance.



Fig. 2. Results of survey given to medical students and surgical residents regarding the usefulness and application of the videos. The questions included the following: #1, The content of the video provided useful and relevant information; #2, I would like to be given more information even if it made the video longer; #3, I would actually use these videos to learn about and review procedures; #4, I would prefer learning about surgical procedures using this method instead of textbooks; and #5, Where would you likely watch the videos? More than one answer was allowed.

technological movement has been cloud computing and people's desire for more access. Cloud computing is the latest trend in mobile communication, where massive amounts of data are stored online. This availability of and the need for easier access to information, entertainment, and education have been changing the technological landscape. We believe that improved access to surgical education is more than desirable; it is imperative and inevitable. To that end, we are creating a virtual surgical amphitheater to provide Web-based videos of operations for surgical residents, medical students, and any physician wishing to learn more about different procedures. We will also be creating an application for the iPhone and iTouch devices (Apple, Inc., Cupertino, Calif.). This will provide viewers with both more access and more options. Initially, we have chosen procedures from the craniofacial and hand surgery specialties because of the small, defined surgical fields (operating area) encountered in those procedures.

Our goal is to provide concise, narrated video footage of surgical procedures that are typically difficult for anyone but the operating surgeon to see. The camera system clips to the operator's surgical loops and connects by means of a USB cord to the laptop, from which the entire operation can be viewed and recorded. The setup has the advantage of giving everyone in the room, and anyone viewing the recording later, the ability to view the procedure from the same perspective as the operating surgeon.

During the editing process, a narrated video approximately 15 to 20 minutes in length is produced, basic enough for medical students to follow and technical enough to teach residents. To accomplish this, only the key aspects and techniques unique to the specific procedure are included. An example of this can be seen in Figure 1, which is two screenshots taken from a cleft lip repair video. The shots show a key anatomical landmark before and after the repair. To assess the usefulness of surgical videos, a sample was presented to students and residents at the Medical College of Georgia. After watching the videos, they filled out a survey, which is summarized in Figure 2. The survey indicates that the overwhelming majority of viewers found the video useful and would implement it in their studies.

We are creating a virtual amphitheater with online videos of surgical procedures to provide medical students, residents, and surgeons convenient access to observe operations. Obviously, there is no substitute for learning in a real operating room, but this comes close to it and has the following advantages: it provides better perspective (surgeon's view) and narrated editing, it accommodates more learners, and it can be replayed at any time. The virtual amphitheater, like its predecessor, will supplement a surgeon's training and play a key role in surgical education. In many ways, technology is about improving access. Including multimedia technology in surgical training is an integral part of offering access to surgical education. DOI: 10.1097/PRS.0b013e3181f6407d

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The Coming Backlash against "Medical Tourism"

Sir:

Proponents of "medical tourism" argue that inexpensive, high-quality medical care can be obtained by traveling to such countries as India, Mexico, and Thailand. Advocates of globalization of health services argue that medical tourism companies and international hospitals can arrange inexpensive cosmetic surgery, cardiac care, orthopedic surgery, and other procedures for price-conscious patients.

Despite the popularization of medical tourism, there is likely going to be a backlash against the notion that medical care can be "offshored" to facilities located far from the home communities of patients. There are several reasons why the medical tourism industry likely will face increased criticism.

First, a growing body of publications reveals that some patients are traveling to international facilities and returning home with serious complications requiring costly additional treatment.^{1,2} Some patients return after experiencing substandard surgical care. Proper infection control has also been a problem at some international clinics.³

Second, medical tourism is often celebrated for promoting patient consumerism. However, for choices to be meaningful, patients need to receive accurate and comprehensive information. Inadequate communication before surgery likely leads some patients to have procedures that in health care settings with higher standards would not be deemed as falling within a professional standard of care. Informed consent, involving full disclosure of risks and benefits of treatment, risks and benefits of alternative forms of treatment, and consequences of not undergoing treatment, is a standard component of patientphysician communication in the United States. Medical travelers often purchase health care packages without meeting their health care providers and having frank conversations about risks and benefits of care. Medical tourism companies and destination health care facilities benefit from maximizing the

number of medical procedures sold to international patients. The financial interest in selling health care packages to international patients could have a powerful framing effect on disclosure of risks and benefits.⁴

Third, proponents of medical tourism promote an understanding of patient care in which surgery is an activity requiring little preoperative discussion, planning, and postoperative care. They assume that patients can undergo surgery and then return home after a brief period convalescing in a hospital or hotel. However, inadequate postoperative care is leading patients to return home with infections and surgical complications.⁵

Medical tourism is marketed on the basis that health care can be offshored much like production of automobiles and electronics. Good medical care, however, involves more than just the act of surgery. It requires preoperative consultation, access to medical records, discussion with patients, careful treatment plans, and proper postoperative care. Such goals are unlikely to be achieved when patients fly to a foreign country, undergo surgery, recuperate for less than a week, and return home with no plan for follow-up care.

Much of the hyperbole surrounding medical tourism does not align well with meaningful patient-physician communication and professional medical care. With increasing numbers of reports about patients traveling abroad and returning home with serious complications, there will likely be growing skepticism regarding the merits of "globalizing" patient care.

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REFERENCES

- Furuya EY, Paez A, Srinivasan A, et al. Outbreak of *Mycobac*terium abscessus wound infections among "lipotourists" from the United States who underwent abdominoplasty in the Dominican Republic. *Clin Infect Dis.* 2008;46:1181–1188.
- Birch J, Caulfield R, Ramakrishnan V. The complications of 'cosmetic tourism': An avoidable burden on the NHS. *J Plast Reconstr Aesthet Surg.* 2007;60:1075–1077.
- Green ST. Medical tourism: A potential growth factor in infection medicine and public health. J Infect. 2008;57:429.
- Cheung IK, Wilson A. Arthroplasty tourism. Med J Aust. 2007; 187:666–667.
- 5. Jeevan R, Armstrong A. Cosmetic tourism and the burden on the NHS. J Plast Reconstr Aesthet Surg. 2008;61:1423–1424.

Has the Time Come for Plastic Surgeons to Move from Povidone-Iodine to Chlorhexidine? *Sir:*

S urgical-site infection is a potential complication that can occur after any type of surgical procedure. Surgical-site infections are classified into three categories: superficial incisional (involving only skin and subcutaneous tissue), deep incisional (involving deep soft tissue), and organ or space surgical-site infections (involving anatomical areas other than the incision itself that are opened or manipulated in the course of the procedure).¹

Clean procedures (nontraumatic; no inflammation encountered; no break in technique; and respiratory, alimentary, or genitourinary tract not entered), which are the procedures most commonly performed by plastic surgeons, are associated with a 1 to 5 percent incidence of surgical-site infection.² The most important determinants of any infectious process are the infecting organism, the environment in which the infection takes place, and the host defense mechanisms. Skin antisepsis, with the use of a solution containing either povidone-iodine or chlorhexidine, is a well-established measure of reducing the incidence of surgical-site infections (Table 1).

There have been several reports in the literature comparing the two most commonly used antiseptic solutions, and the majority of them demonstrate superiority of chlorhexidine over povidone-iodine solutions. The Centers for Disease Control and Prevention recommends that 2% chlorhexidine-based preparations be used to cleanse the site of insertion of vascular catheters to decrease the risk of vascular catheter–related bloodstream infection.³ A recently published prospective, randomized, clinical trial demonstrated a 41 percent reduction in the risk of surgical-site infection when chlorhexidine was used, instead of povidone-iodine solution, with a number needed to treat of 17.³

Nine plastic surgery attending physicians, who work in either a private or an academic setting in the metropolitan area of Chicago, Illinois, were contacted and asked what type of antiseptic solution they use for their procedures, excluding the craniofacial ones. Eight of

Table 1. Characteristics of Chlorhexidine- and Povidone-lodine-Containing Antiseptic Solutions

Antiseptic Solution	Mechanism of Action	Comments
Chlorhexidine	Disruption of cell wall	Rapid action; can cause ototoxicity and eye irritation; longer residual effect
Povidone-iodine	Oxidation and substitution by free iodine	Minimal residual activity; broad antibacterial spectrum; possible absorption toxicity and skin irritation

nine (88.8 percent) responded that they prefer povidone-iodine solution, over chlorhexidine, for different reasons, none of which included the available evidence on the efficiency of either one of them.

A randomized controlled trial, published in the November of 2008 issue of *Plastic and Reconstructive Surgery*, recommended the use of chlorhexidine before elective clean plastic surgery procedures.⁴ Is there a need for another trial in the plastic surgery patient population, or has the time come for plastic surgeons to move from povidone-iodine to chlorhexidine? DOI: 10.1097/PRS.0b013e3181f64091.

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REFERENCES

- Horan TC, Gaynes RP, Martone WJ, Jarvis WR, Emori TG. CDC definitions of nosocomial surgical site infections, 1992: A modification of CDC definitions of surgical wound infections. *Infect Control Hosp Epidemiol.* 1992;13:606–608.
- Culver DH, Horan TC, Gaynes RP, et al. Surgical wound infection rates by wound class, operative procedure, and patient risk index: National Nosocomial Infections Surveillance System. Am J Med. 1991;91:152S–157S.
- Darouiche RO, Wall MJ Jr, Itani KM, et al. Chlorhexidinealcohol versus povidone-iodine for surgical-site antisepsis. *N Engl J Med.* 2010;362:18–26.
- 4. Veiga DF, Damasceno CA, Veiga-Filho J, et al. Povidone iodine versus chlorhexidine in skin antisepsis before elective plastic surgery procedures: A randomized controlled trial. *Plast Reconstr Surg.* 2008;122:170e–171e.

Microsurgery Trainer with Quantitative Feedback: A Novel Training Tool for Microvascular Anastomosis and Suggested Training Exercise

Sir:

Traditionally, microsurgical skills are taught in the operating room and the burden of the trainee's inexperience is placed on the surgeon. The emergence of surgical skills laboratories with simulation exercises is an attempt to displace this burden to a more controlled environment. Practice and repetition, afforded by simulation, is required to develop and maintain microsurgical motor skills.^{1,2}

The use of microsilicone tubes is an excellent way to practice tying knots in three dimensions under the operating microscope.³ Several training tools have incorporated microsilicone tubes; however, none of these produces quantifiable results.^{2,4} We describe a novel microsurgery trainer and associated training exercise that is cost-effective and provides objective quantifiable data.

The microsurgical trainer with quantitative feedback consists of a 7.5×4.5 -cm acrylic platform with two elastic retaining straps for stabilization of a double-opposing clamp, which holds the two cut ends of a thin-walled



Fig. 1. Trainer platform with double-opposing clamp and microsilicone tube.



Fig. 2. Setup for anastomosis leak pressure evaluation. The microsilicone tube anastomosis is connected to a syringe and a pressure gauge by means of a three-way stopcock. The timer pictured is used to record the time to completion of the anastomosis.

Volume 126, Number 6 • Viewpoints

microsilicone tube (internal diameter, 0.6 mm; external diameter, 1.2 mm). Four suction cups anchor the platform and prevent movement during use (Fig. 1). After completion of an anastomosis, a fluid-filled syringe and a pressure gauge are attached by means of Luer-lock adapters (Fig. 2). Fluid is then pushed through the anastomosis until a leak is indicated by a blot appearing on paper beneath the silicone tube. The pressure at which this leak occurs is recorded as the leak pressure.

The training exercise proposed with this device involves performing an end-to-end anastomosis between two cut ends of a microsilicone tube under the operating microscope in an interrupted fashion using 9-0 nylon suture. The time to complete the anastomosis with six interrupted sutures is measured, and the leak pressure is determined.

Eight residents at various stages in their training completed the exercise at least twice, for a total of 23 anastomoses. The results demonstrated improvement in leak pressure and time to completion throughout training (Fig. 3). There also appeared to be a trend toward improvement in time to completion by each individual from one trial to the next, showing apparent technical progress after using the trainer for a short time.

Our model improves on other training tools that have incorporated microsilicone tubes in terms of versatility, cost-effectiveness, and provision of reliable, measurable results. It allows for practice and evaluation of rudimentary microsurgical skills. The platform can be rotated without interrupting the tubing for practice in multiple axes, and raised boundaries can be placed around it to simulate a deeper anastomosis. It also has a low fixed cost and low variable cost related to replacement of microsilicone tubes. The addition of a pressure gauge, as opposed to a simple leak check used in earlier models, provides a precise record of the pressure required to cause anastomosis leakage. Concurrently timing the anastomosis encour-



Fig. 3. Relationships between mean time to completion of an anastomosis and postgraduate year (*above*) and mean leak pressure of the completed anastomoses and postgraduate year (*below*). Both plots demonstrate a trend of improvement in the measured variable with additional years of training.

ages quick but careful work and allows for practice and self-evaluation at any level of training.

The goal of our microsurgical training model is to help ensure that trainees are well prepared before operating on animal models and patients. This microsurgery model represents an intermediary in the educational training process. DOI: 10.1097/PRS.0b013e3181f6402d

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DISCLOSURE

The authors have no conflicts of interest or competing financial interests with regard to this article.

REFERENCES

- Wang F, Su E, Burdet E, Bleuler H. Development of a microsurgery training system. *Conf Proc IEEE Eng Med Biol Soc.* 2008; 2008:1935–1938.
- 2. Matsumura N, Hayashi N, Hamada H, Shibata T, Horie Y, Endo S. A newly designed training tool for microvascular anastomosis techniques. *Surg Neurol.* 2009;71:616–620.
- 3. Peled IJ, Kaplan HY, Wexler MR. Microsilicone anastomoses. *Ann Plast Surg.* 1983;10:331–332.
- Ilie VG, Ilie VI, Dobreanu C, Ghetu N, Luchian S, Pieptu D. Training of microsurgical skills on nonliving models. *Micro-surgery* 2008;28:571–577.